

20. Careers of Korean Ph.Ds with Degrees of Foreign Countries and the HRD Policy of the Highly Skilled in Korea

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1. Overview

Due to the development of information and communication technology, the advancement of science and technology, and the rapid globalization, the investment in R&D and the development and utilization of highly skilled and talented human resources in science and technology areas have become critical. In general, people who have been educated and who have earned a doctorate degree in a good educational environment of advanced countries are considered to be highly talented human resources with global competitiveness. Therefore, the utilization of those doctoral recipients has great implications on the advancement of national R&D of Korea. Nevertheless, there are few surveys and research in status and current conditions of doctoral recipients in science, technology and engineering areas who earned their degree abroad.

This research aims to investigate career development activities, career histories and trajectories, and current status of doctoral recipients who earned their degree abroad, in particular in the areas of science, technology and engineering (or STE foreign doctoral holders). The results of this research are expected to provide policy implications on how to utilize highly skilled and talented human resources with global competitiveness. The research focuses on two important aspects of STE foreign doctoral holders' career development. First, the research examined the STE foreign doctoral holders' transition patterns to the labor market after graduation; in other words, school-to-work transition processes. Second, the research looked at international mobility of higher skilled human resources as a result of STE foreign doctoral holders' decision to come back to Korea or stay in a foreign country after graduation.

In order to investigate current career status of the STE foreign doctoral holders, we analyzed data from two main data sources; Korea Research Foundation's Database for Report of Doctoral Degree Earned in a Foreign Country, and the Survey of Earned Doctorates(SED) of the U.S. National Science Foundation. Also, we conducted two rounds of our own survey of STE foreign doctoral holders(n=454) who earned a doctorate degree in the United States, and interviewed ten STE doctoral holders who earned their degree in the U.S. In addition, we carried out case studies, interviews with experts, and an expert seminar in order to draw policy implications.

2. Main Results of the Research

A. The overall number of foreign doctoral holders and the status of doctoral recipients who earned their degree in the U.S.

First, for the past 15 years, the number of foreign doctoral holders has been dramatically increased. On average, each year 1,100 foreign doctoral holders are produced in all academic fields. Among those, 700 doctoral holders are in the STE fields. In 1980s, the percentage of foreign doctoral holders reached the highest record of 30%. Since then, the percentage of foreign doctoral holders compared to the total doctoral holders who earned a doctorate degree either in Korea or foreign countries has been gradually decreased. This decline of the percentage of foreign doctoral holders in the STE fields has been more noticeable than other fields. This is partly due to the dramatic increase of doctoral recipients who earned their degree in Korea. This overall increase of the number of doctoral holders means more intense competition for the limited positions and jobs in the labor market between foreign and domestic doctoral holders.

Second, in the STE fields, 85% of foreign doctoral holders earned their degree in one of two countries; 60% from the United States and 25% from Japan. Thus, it is important to target future research's focus on doctoral recipients who earned their degree from either the U.S or Japan. The future research questions may include investigating their decision to return back to Korea or not after graduation, their career development trajectories, and conducting a cross-national comparison study between doctoral holders from the U.S and Japan.

Third, the number of doctoral holders shows a gradual increase since 2000 after a slight decline around the time of the IMF foreign currency exchange crisis in 1997-1998. Overall, the number of doctoral recipients who earned their degree in the U.S has been stayed at the stable range of 1,300~1,500 for the past 20 years. Among those, 93% are non-U.S citizens who went to the U.S for advanced study after graduating from a college or university in Korea. The number of STE doctoral holders who earned their degree in the U.S. is approximately 700~900 (per year), and it comprises 60% of the total doctoral recipients from the U.S. in all fields.

B. Background characteristics, motivation for studying abroad, and satisfaction with curriculum and educational environments of doctoral recipients who earned their degree in the U.S.

First, about 20% of all STE doctoral holders in Korea earned their degree in the U.S. They tended to go to one of the best undergraduate colleges or universities in Korea with a good family background (e.g., the educational level of their parents is higher than that of the overall population) and a high undergraduate GPA. This indicates that they are high quality human resources and the target subjects of high quality human resources policies.

Second, our own survey shows that they chose to pursue their graduate study in the U.S. because of high quality educational environments and conditions in the U.S. Also they showed a high level of satisfaction with curriculum and educational

environments of their graduate study program. This illustrates strong competitiveness of curriculum and educational environments of the U.S. graduate study program. Moreover, this implies that one of possible incentives to attract higher quality human resources into Korea is to establish high quality doctoral study programs in Korea which meet a global standard. Those programs should provide high quality educational environments that include high quality faculty members, research facilities, and curriculum. In addition, doctoral recipients who earned their degree in the U.S. chose to study abroad because of diverse financial support opportunities including high availabilities of RA or TA positions. They also showed a high satisfaction level with the financial support they got while they were studying in the U.S. This implies that the level of financial supports and opportunities for getting a RA or TA position for doctoral students in Korea should be getting increased than the current level.

Third, approximately 20% of doctoral recipients who earned their degree in the U.S. had already planned to stay in the U.S. when they began their study in the U.S. Those who had already planned to stay in the U.S. from the beginning of their study tend to stay in the U.S. after obtaining their degree or going back to the U.S. even after temporarily coming back to Korea after graduation. Thus, it is important to investigate career paths of those doctoral holders who had planned to permanently stay in the U.S. and reasons behind their decision. It seems to be difficult to lure those doctoral holders who had planned to stay in the U.S. from the beginning into Korea after graduation. Therefore, instead of such a policy that tries to draw them into Korea, we need to seek alternative policies that make them contribute to their knowledge and expertise to Korea while they are staying abroad.

Fourth, about 80% of doctoral recipients who earned their degree in the U.S. said the main reason why they decided to pursue their doctorate degree was to become a professor. On the other hand, 63% said they chose to pursue their degree to become a researcher. Therefore, although doctoral holders' preference to professor positions are still high, their career path to researcher positions seems to become getting popular. From the point of the utilization of high quality human resources, we need to take our attention to career path and career development of tenure track "researchers."

C. Career activities after obtaining a doctorate degree

At the time of receiving a doctorate degree, higher percentage of Korean doctoral recipients who earned their degree in the U.S. compared to the total doctoral recipients in the U.S. chose a post-doctoral research position as their immediate career path. Our own survey also confirmed that in science, technology and engineering fields, more than 75% of doctoral holders completed a post-doctoral course. Thus, a post-doctoral study course became a common practice after getting a doctorate degree in the STE fields. Moreover, more than 90% of doctoral recipients who earned their degree in the U.S. planned to go through a post-doctoral course in the U.S. This may cause a temporary delay in their return to Korea. Completion of a post-doctoral study is often a necessary requirement for professor positions. Thus, those who are on a post-doctoral study program are considered to be candidates for professors. This implies that more Koreans than the whole doctoral recipients

in the U.S. pursue professor positions.

As of 2004, i.e., two years after obtaining a doctorate degree, 6.3% of doctoral recipients who earned their degree in the U.S. were still seeking a job or unemployed. This unemployment or underemployment rate was lower than that of doctoral recipients who earned their degree in Korea. Of the total full-time employed (excluding post-doctoral researchers), 40% of doctoral recipients who earned their degree in the U.S. work at higher education institutes. About 65% of doctoral recipients engage in research and development(R&D) work. A slightly higher percentage of doctoral recipients who returned back to Korea after obtaining their degree in the U.S. engage in education and teaching job than those who stayed in the U.S. Moreover, the part-time or post-doctoral employment rate of doctoral recipients who came back to Korea is lower than that of doctoral recipients who stayed in the U.S. This implies that employment status of the doctoral holders who returned back to Korea after obtaining their degree in the U.S. is more secure and stable. This is partly because people tend to return to Korea only after they secure stable employment.

Two third of the full-time employed doctoral recipients evaluated that their job was relevant to what they studied. However, one third of the doctoral recipients who worked in Korea judged that their job did not require the level of doctoral study.

In general, the level of satisfaction with their current job was high. The satisfaction level of doctoral recipients who stayed in the U.S. was slightly higher than that of doctoral recipients who returned to Korea. Doctoral recipients who worked at a higher education institute showed a higher satisfaction level with their job than those who worked at industrial or private sectors. In particular, the doctoral recipients who returned to Korea and worked at a company showed the lowest level of satisfaction with their job.

Since we surveyed new doctoral recipients who earned their degree during last five years, only 23% of the respondents indicated job change experiences. While the doctoral recipients who returned to Korea showed a very clear converging job-change pattern to professor positions, the doctoral recipients who stayed in the U.S. do not show a common pattern.

The doctoral recipients who returned to Korea and are working at a private company show low satisfaction with their job and their job requires lower level of skills and knowledge than what they studied; This implies a severe problem in utilizing high quality human resources. In other word, this raises policy questions of not only how to attract more doctoral recipients who earned their degree abroad but also how to utilize those human resources to maximize their capacity and talent. If doctoral recipients returned back to Korea after obtaining their degree abroad but their advanced knowledge and skills are being under-utilized, this would cause dissatisfaction to individuals and inefficiency and waste to the nation as a whole. In order to promote efficient utilization of doctoral recipient resources in private sectors we need to conduct in-depth investigation of doctoral recipients' employment conditions and status in private sectors. At the same time, we need to analyze the quality that private sectors demand from those who earned a doctorate degree abroad. Based on those analysis, we need to develop strategies to attract and utilize highly skilled and talented human resources.

D. International mobility of doctoral recipients after obtaining their degree in the U.S.

The Survey of Earned Doctorate by the National Science Foundation of the U.S. surveys all of the doctoral recipients at the time of their graduation from any of doctoral degree granting colleges or universities in the U.S. One of the most important findings from the SED data is a gradual decline of Korean citizens who plan to return back to Korea right after obtaining a degree in the U.S. Two third of Korean doctoral recipients who earned a degree in the U.S. have a plan to stay in the U.S. after graduation. During the past 20 years, the percentage of Korean STE doctoral recipients who earned a degree in the U.S. and planned to stay in the U.S. has increased by 25% so that three fourth of Korean STE doctoral holders stayed in the U.S. right after graduation. However, this stay in the U.S. after graduation does not necessarily mean a permanent stay. Rather, it is often a temporary stay while they are taking a post-doctoral study course or temporary employment in the U.S. When we cross checked data from both SED and Korea Research Foundation's Database, it was estimated that about 50% of STE doctoral holders stayed in the U.S. for a long term. The returning rate of Korean doctoral recipients who earned a degree in the U.S. after graduation has been declined since 1994. Since 2000, however, the returning rate remains at a constant level. Therefore, this shows a different pattern with the increasing percentage of the returning plan reported right after graduation.

Our own survey shows that one third of the doctoral recipients who earned a degree in the U.S. permanently settled down in the U.S. Main reasons of such permanent (or at least a long term) stay in the U.S. include higher quality research and work environments, and better conditions to raise and educate their children in the U.S. than Korea. On the other hand, main reasons of returning to Korea after obtaining a doctorate degree include the unquestionable fact that Korea is their home country and job discrimination is rare in Korea. For people who had planned to stay in the U.S. from the beginning of their study in the U.S., the rate of a permanent stay in the U.S. increases as they show a lower motivation to be a professor, took more time to complete their degree, have a full-time permanent job, have higher satisfaction with their current job, have a less bright outlook for Korean job market, and a brighter outlook for international job market.

Few percentage of the doctoral recipients who earned a degree in the U.S. and returned back to Korea have a concrete plan to go abroad for a job in the near future. Nevertheless, 40% of them responded that they could go abroad whenever a right opportunity comes along. The main reason why they consider to go abroad for a job is because of better educational environments and opportunities for their children. The planning rate to go abroad for a job increases when they had planned to stay in the U.S. at the beginning of their doctoral study, are in science, technology, engineering fields, took shorter time to complete their degree, and less satisfied with their current job. This result implies that providing high quality working environment and a better support system for their children's education are critical factors to attract more doctoral recipients who are staying in the U.S. after graduation and to prevent those high quality human resources who were educated in the U.S. from going abroad again for a job.

3. Policy Implications for Utilizing High Quality Human Resources Who Earned a Doctorate Degree Abroad

A. Basic directions

The policies should be made with a basic understanding that those high quality human resources who earned a doctorate degree abroad are attracted to a job that offers a better research and work environment rather than a physical location of a job. Indeed, they are globally competitive human resources. It is inappropriate to force them to return back to Korea because Korea is their home country by taking a nationalism or close minded perspective. Therefore, from effective and efficient utilization perspectives, the policies should support them to maximize their potential capacity no matter where they live..

B. Policy recommendations for the utilization of high quality human resources

- 1) Strategies to attract more doctoral recipients who earned a degree abroad into Korea after graduation include better and improved social and financial reward systems, increased opportunities for them to take a high quality post-doctoral study program in Korea, an expansion of tenure-track, R&D faculty positions, support system for their children's education, and permission to a dual citizenship.
- 2) Strategies to construct environments that support effective utilization of high quality human resources include fostering support systems to promote partnership and collaboration between industry, universities, and research institutes, utilizing more doctoral recipients in government-funded research institutes, and developing a new career development model for tenure-track "researchers" and support system for researcher career path.
- 3) Strategies to utilize high quality human resources who earned a doctorate degree abroad and stay abroad after graduation include increased opportunities for international collaboration between researchers in Korea and abroad, building a network of Korean science, technology and engineering expertises abroad, and the expansion of projects that promote short and long term visits to Korea of high talented Korean researchers who stay abroad.
- 4) Strategies to collect and manage HRD data on Korean high quality human resources abroad include constructing a database system to collect and manage such data, introducing a local official position that collects high quality HRD data in each country, initiating international collaborative research that studies issues of education and utilization of global talents, a panel study that follows current undergraduate students through their graduate study and/or employment, and constructing and facilitating a website that supports high quality Korean human resources who stay abroad.

C. Recommendations for utilizing high quality human resources who earned a degree abroad in private sectors

A few large corporations are equipped with a sophisticated human resources management system from recruitment to retirement in order to effectively utilize the high quality human resources who earned a degree abroad. Nevertheless, many doctoral holders tend to leave a corporation for universities or research institutes whenever an opportunity comes along. This is partly because corporations' culture usually values an immediate outcome and achievement and their organizational culture is often bureaucratic and rigid. Thus, in order to effectively utilize the high quality core talents in private sectors, they need to improve their R&D culture to allow practicing research that maximizes their capacity with a long term vision. Additional support systems should be developed for small and medium enterprises which do not have their own system and capacity to attract and utilize the high quality doctoral holders. Such a support system include strategies to utilize high quality human resources who earned doctorate degree abroad as short term consultants or technical coaches.